Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETIC RECORDING APPARATUS USING THE SAME
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet I of 11

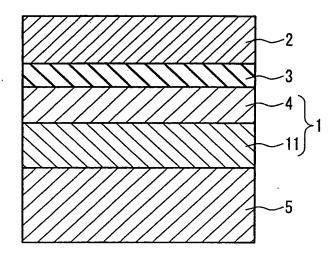


FIG. 1

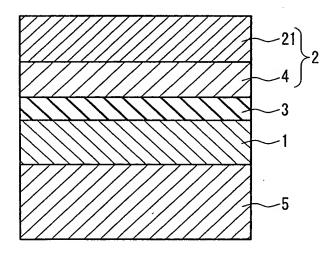


FIG. 2

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 2 of 11

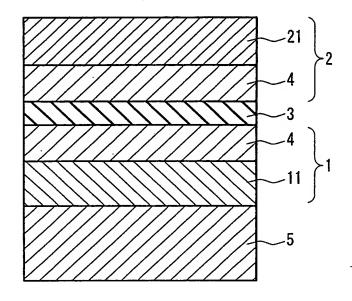


FIG. 3

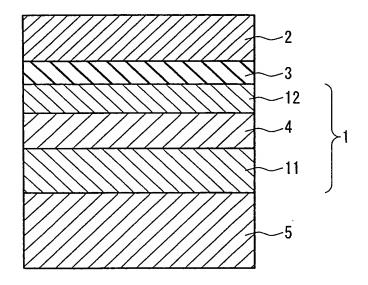


FIG. 4

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETIC RECORDING APPARATUS USING THE SAME
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 3 of 11

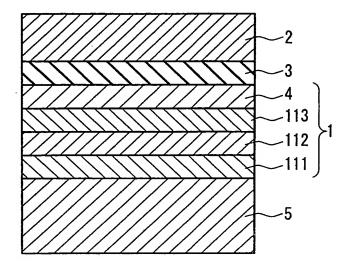


FIG. 5

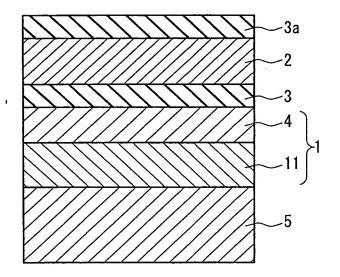


FIG. 6

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 4 of 11

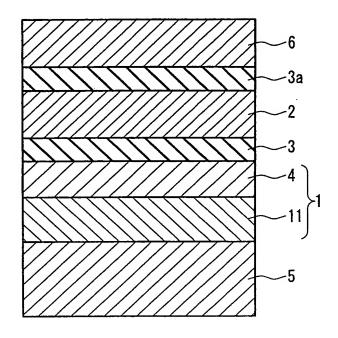


FIG. 7

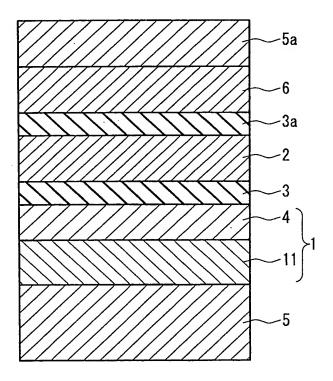


FIG. 8

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 5 of 11

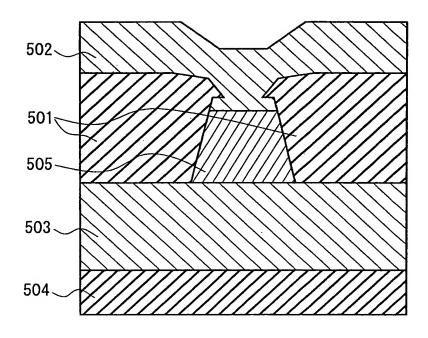


FIG. 9

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETICRESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 6 of 11

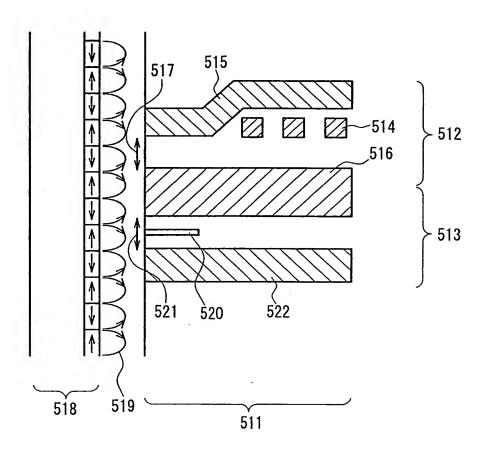


FIG. 10

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 7 of 11

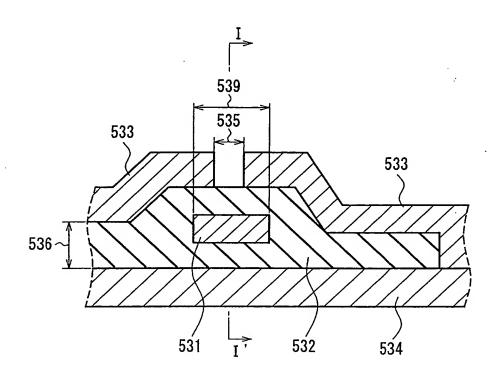


FIG. 11

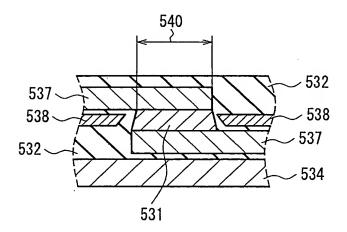


FIG. 12

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 8 of 11

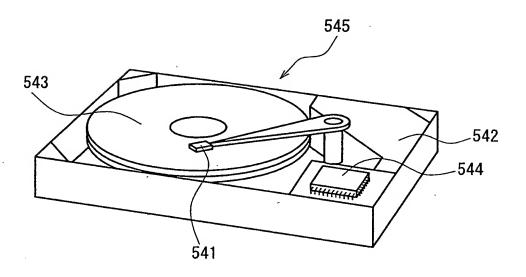


FIG. 13

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 9 of 11

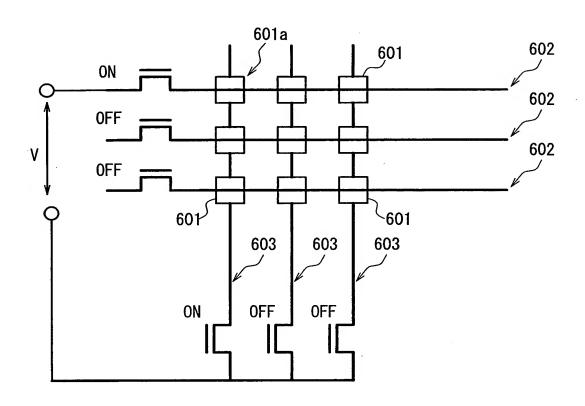


FIG. 14

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 10 of 11

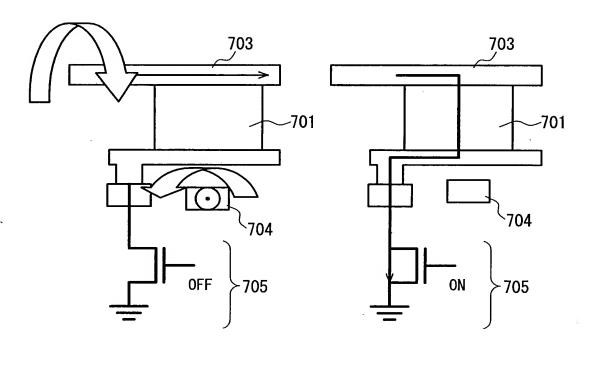


FIG. 15B

FIG. 15A

Inventor: SUGITA et al.
Docket No.: 10873.1317USC1
Title: MAGNETORESISTIVE ELEMENT, MAGNETIC HEAD, MAGNETIC MEMORY
AND MAGNETIC RECORDING APPARATUS USING THE SAME
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 11 of 11

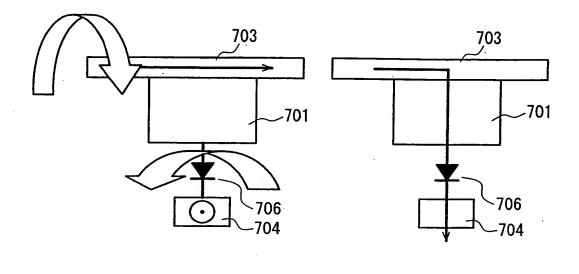
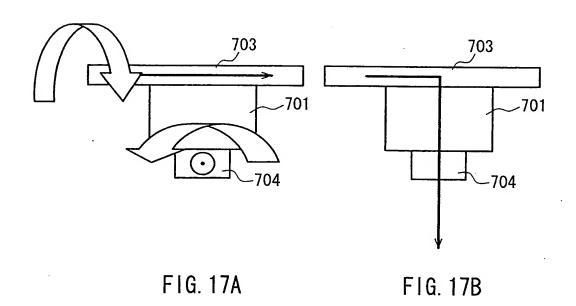


FIG. 16A

FIG. 16B



11/11